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Setting Triacs and Alternistors on in Various Quadrants

Gating Quadrants of Triacs and Alternistors is one of the most misunderstood parameters of thyristor type devices. These quadrants have nothing to do with the 360° in one AC sine wave. You might want to consider these quadrants as gating modes.

The first thing to remember is that the gate signal is always referenced to the MT1 or cathode lead (do NOT place a load between MT1 terminal and the power supply reference, see figure 2). The second item to consider is the polarity of the gate pulses with regards to the MT1 lead. Third is the polarity of the voltage (which half cycle) on the MT2 lead, with respect to MT1.

Definition of Gating Quadrants (ALL Polarities are referenced to MT1)

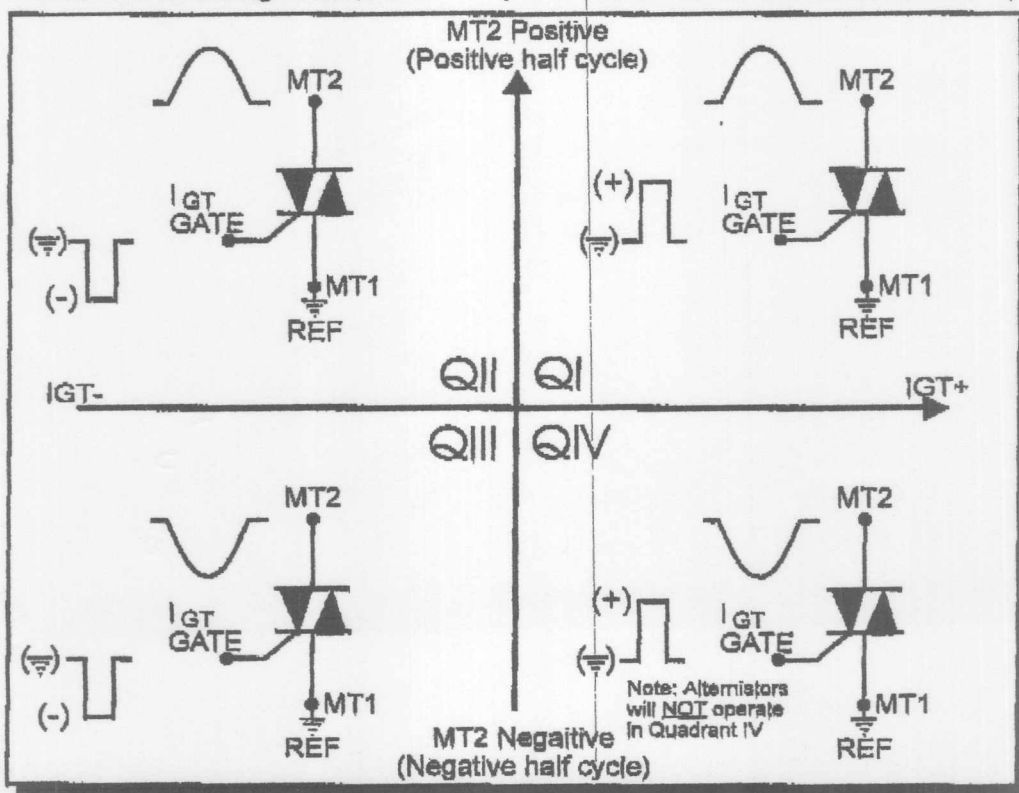


Figure 1

Gating Triacs and Alternistors on in Various Quadrants

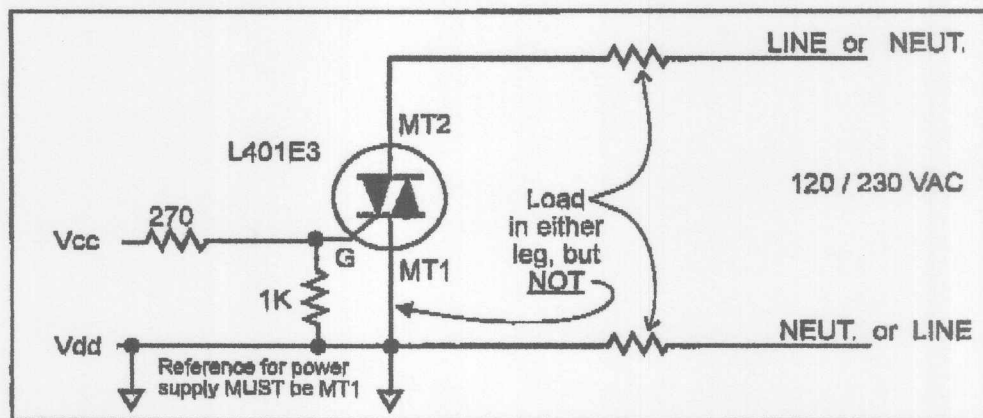


Figure 2

Teccor's sensitive gate Triacs may be gated on in all four Quadrants. With a in-phase signal (gate synchronized to MT2, see figures 3 & 4) in which Quadrants I and III are used, or by applying unipolar signals (gate always positive or always negative). If a positive signal is applied to the gate (see Figures 2 & 5), the Triac is turning on in Quadrant I (this is during the positive half cycle) and Quadrant IV (this is during the negative half cycle). If a negative signal is applied to the gate (see Figure 6), the Triac is gated on in Quadrant II (this is during the positive half cycle of the AC line) and Quadrant III (this is during the negative half cycle).

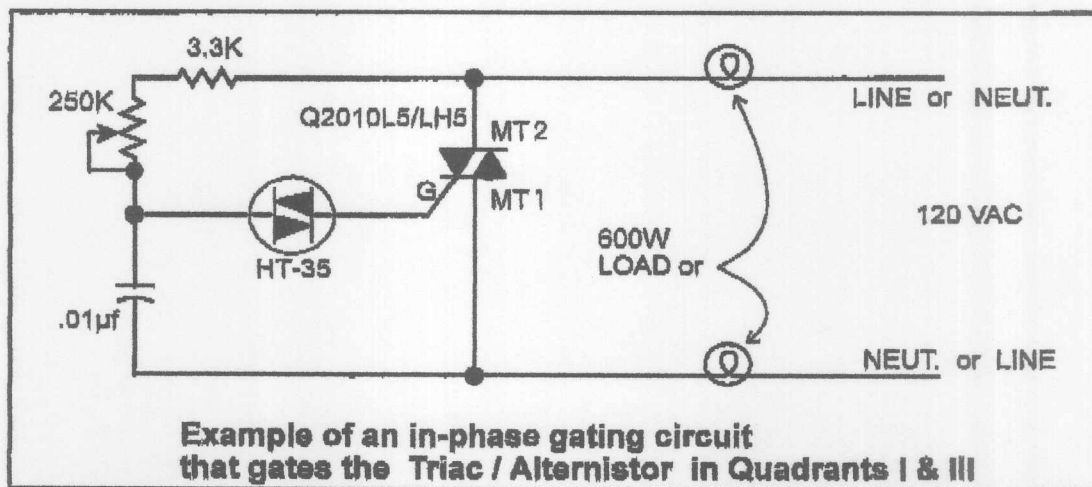


Figure 3

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Gating Triacs and Alternistors on in Various Quadrants

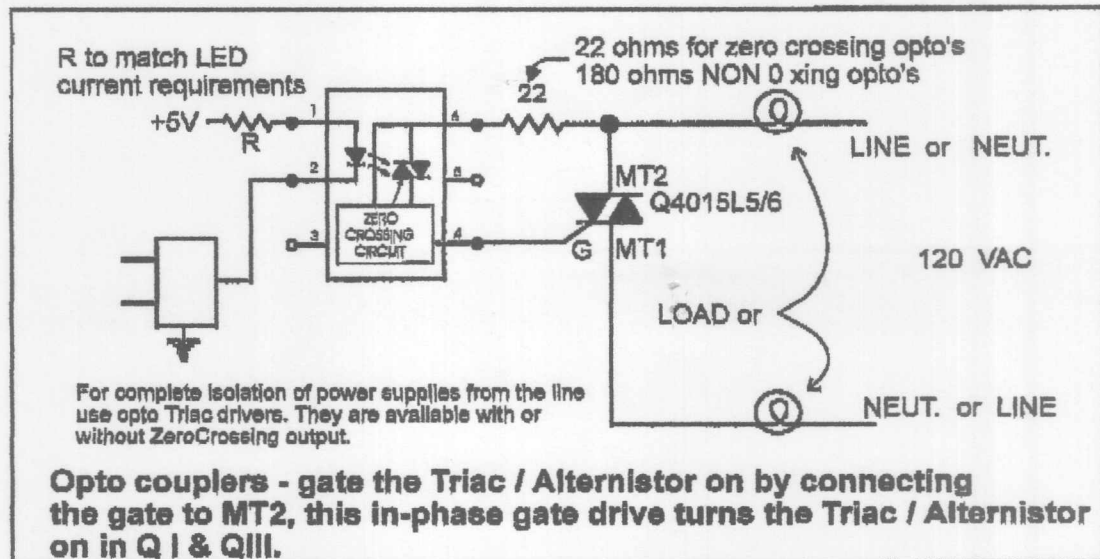


Figure 4

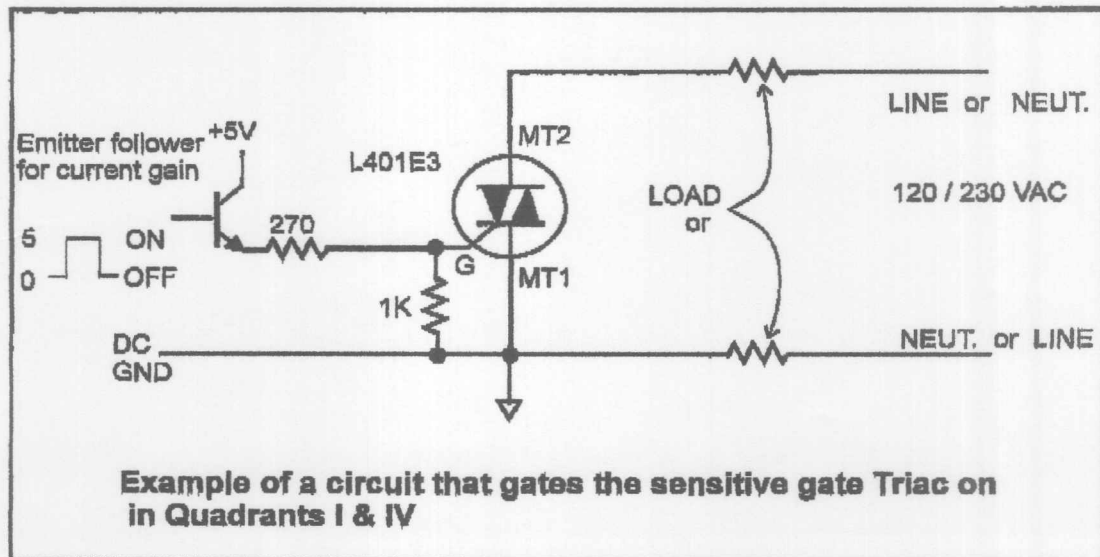


Figure 5

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Gating Triacs and Alternistors on in Various Quadrants

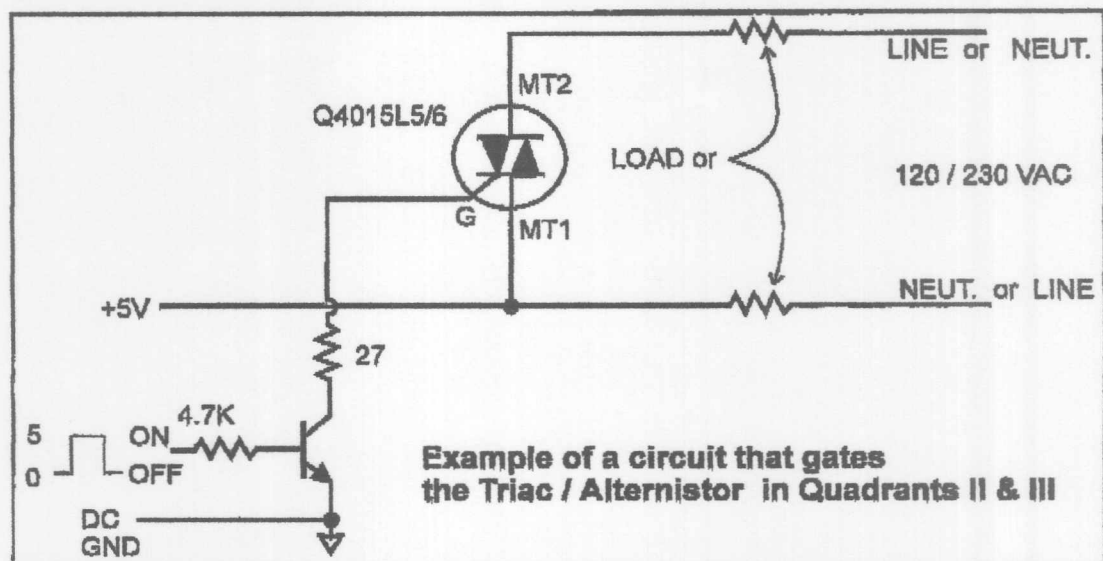


Figure 6

Changing Quadrants, driving larger loads from low voltage, lower current sources

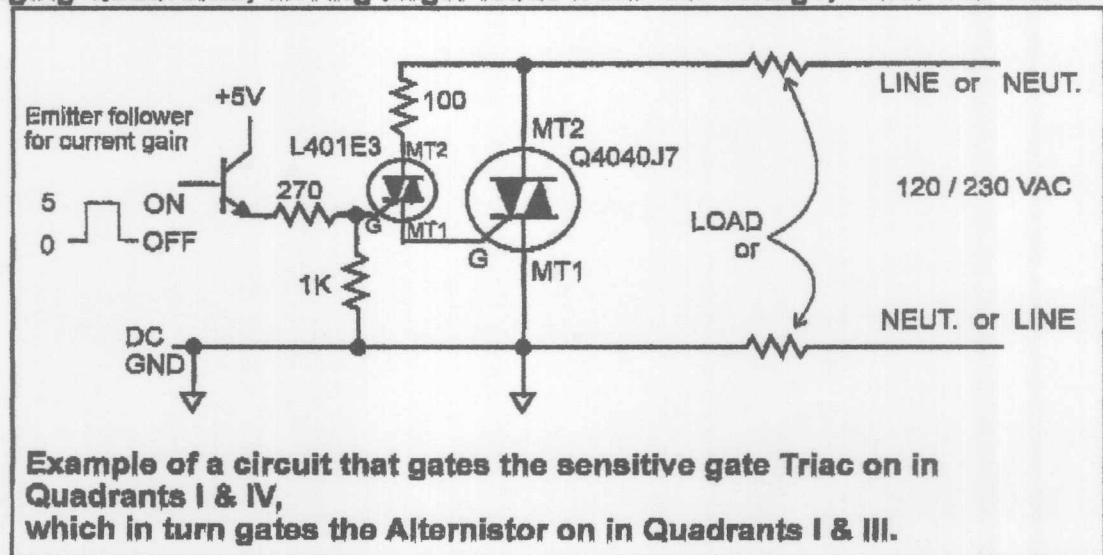


Figure 7

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